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ABSTRACT

This paper introduces an artistic model of planning and problem solving. The model is based on a case study of processes engaged in by a college art student during the course of producing a senior thesis in batik (a wax-resist fabric dyeing process). Based on the premise that knowledge of the creative process is essential to understanding the art-making process, the author offers a step-by-step description of creative activities undertaken during the three-month process of batik creation. Various techniques of naturalistic inquiry (the investigation of phenomena within and in relation to their naturally occurring contexts) were used to gather information, including observing and listening to the artist as she worked on and thought about the batik, interviewing the artist, analyzing the artist's daily journal, reviewing field notes, and examining photographic documentation of the batik during various stages of production. During the period of data collection, concepts and hypotheses were generated and tested against previous data and ongoing behavior. The end result of this testing and conceptualization was a theoretical model of artistic planning and problem solving in which three stages of artistic activity were identified: problem finding, problem formulation and solution, and solution evaluation. The conclusion is that artists and art researchers will better understand the planning and problem-solving processes involved in the production of art if they use a process model such as the one suggested in this paper to clarify what is going on in the artist's mind at various stages of the art-production process. (DB)

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Batik Making as Creative Problem Solving:

A Naturalistic Inquiry

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SUMMARY

Despite the fact that the content of art educational research reveals an extensive interest in the making of art --Chapman (1979) notes that the "largest single body of theory and research in our field deals with the artistic process, the psychology of making and creating art" (p.7)-- the creative process is still largely a mystery which eludes the researcher. Before there can be analysis and explanation of the art-making process, there must be description and understanding. This investigation of the batik-making process was intended to address that need for descriptions and theoretical models of artistic making.

The primary purpose of this investigation was to describe artistic planning and problem solving by means of a detailed case study of one college art student's production of a senior thesis in batik (a wax-resist fabric dyeing process) over a three-month period. The artist's creative thinking was viewed in terms of her planning and problem solving strategies as she mentally and physically worked her way through her own creative activity. The study employed techniques of naturalistic inquiry, particularly ethnography and process tracing, to gather the information.

Naturalistic inquiry, "the investigation of phenomena within and in relation to their naturally occurring contexts" (Willems and Rausch, 1969, p.3), was chosen due to its success in other complex and ambiguous environments in eliciting information about the situation (see Yinger, 1977, 1978). This method proved to have merit in comprehending the vague and usually covert art-making situation. The naturalistic approaches of process tracing and observation were selected as the most appropriate methods for sharing in the batik process, since they allow both subjective interaction and distance as conditions for generating and interpreting data. While standing outside the personal, experiential creative process of the artist, the researcher had access to the insider's point of view, and was able to see, as nearly as possible, the evolutionary phenomenon as the artist did.

By observing and listening to the artist as she conceived and produced two batiks, the researcher sought to determine the steps by which creative works come into being, and to shed light on the sources, and on the course, of creativity -- from the germinal idea to the final product. The researcher observed environmental factors and behavioral strategies while the student-artist worked in the college crafts studio and in her home studio. The artist's problem-finding modes and problem-solving decisions were tape recorded as she "thought aloud" during the planning and work periods. Interviews (for clarification purposes), journal entries (for amplification) and field notes were also employed. Further visual verification was supplied through the photographic documentation of the works-in-progress (in the forms of slides and black-and-white prints). All of the sources together provided a

"triangulation" (validity through multi-perspective agreement) of the information generated.

During the period of data collection, concepts and hypotheses were generated and tested against previous data and ongoing behavior. The culmination of this alternation between data collection and conceptualization was a theoretical model of artistic planning and problem solving. Its configuration was influenced by: (1) Yinger's (1978,1980) model of teacher planning that emphasizes finding the planning problem and developing it by means of a cyclical design process; and by (2) Getzels and Csikszentmihalyi's (1976) research on the artist's problem-finding behavior, which stresses the crucial role of the "discovered" (versus the "presented") problem situation in thinking and creating.

The model addresses the truly creative aspect of planning and problem solving: the discovery and formulation of the problem itself. Getzels and Csikszentmihalyi believe that the problem solver must become a problem finder, posing the problem first, before beginning to envision a method towards its solution. They view creativity as a sensitivity to previously unformulated tensions and as the ability to express these feelings as problems that can be solved. The key to creativity, they assert, lies in the "transformation of the intangible conflict into a tangible symbolic problem to which the creative solution will be the response " (p/246). Truly understanding creativity involves not only witnessing the artist's problem-solving behavior, but also appreciating the artist's sensitivity to, and imaginative capacity for, finding the problem in the first place. Consequently, in this study there was a dual emphasis on eliciting information about the problem-finding and the

problem-solving phases of the art process, as both functions of creative thinking were regarded as essential in a complete and substantial description of the batik-making process.

The perspective taken in the study follows the problem-solving approach, as defined by Newell, Shaw and Simon (1964). They contend that problem solving may be called creative if one or more of the following conditions is satisfied:

1. The product of the thinking has novelty or value.

2. The thinking is unconventional, in the sense that it requires modification or rejection of previously accepted ideas.

3. The thinking requires high motivation and persistence taking place over a considerable time span or at a high intensity.

4. The problem as initially posed was vague or ill-defined, so that part of the task was to formulate the problem itself. (Paraphrased from Newell, Shaw, and Simon, p.778.) While all of these requirements were satisfactorily met by the artist in this study, as determined through an analysis of the collected data, it was the fourth condition noted above that most significantly influenced the eventual form of the model.

The Model of Creative Planning and Problem Solving

Three stages of artistic acitivity were identified and described in the process model (figure 1): (1) Problem Finding; (2) Problem Formulation and Solution; (3) Solution Evaluation and Routinization. (In reality, it is generally held that there is considerable fluidity from one stage to another, as well as from one mental state to another within each stage.)

The initial stage - Problem Finding (figure 2) rests on the assumption that the artist seeks that which is novel and original in attempting to represent an inner state, that is, in establishing an equation between inner tensions and the objective reality of a work of art. Therefore, the first task of the artist is to disclose a suitable and significant experience to portray.

This problem-finding process is represented in the model by the general arting dilemma, that period characterized by tremendous openness to almost boundless possibilities. The model identifies three influences on the artist in the creative search predicament: (1) environment and organization, (2) artistic production constraints, and (3) personal characteristics.

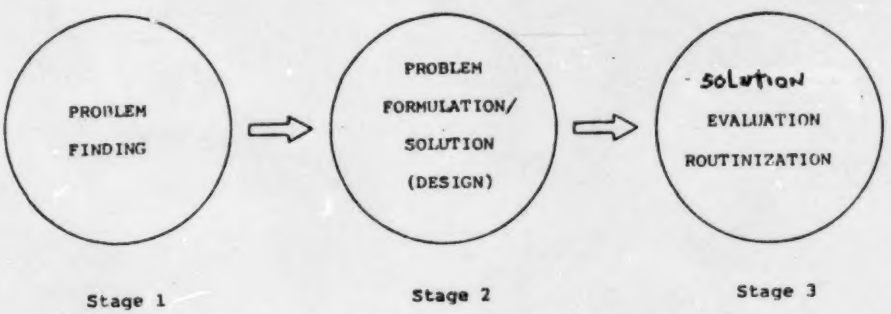

Figure 1. Stages of the general planning process.

The environment and organization refers to the physical characteristics of the studio facility, the length of the working period, and the artist's relationship with others in her work space. The production constraints include any limitations or guidelines governing the compliance of the proposed project to any of the formal regulations on the process or outcome. The personal characteristics of the artist are those qualities which are an intrinsic part of the individual's nature which may affect the production of her or his art--personality, intelligence, background, maturity, achievement motivation, health and stamina, attitude, artistic ability, etc.

How the general arting dilemma is made more specific is illustrated in the model by the discovery cycle. Here, the actual location of the problem occurs through the interactivity of the artist's concept of the planning dilemma, knowledge and experience, artistic goal conceptions, and the materials available. The first three, naturally, occur "inside" the artist--within the mind, with the last factor physically "outside" the artist. (However, the qualities, possibilities and limitations of the physical, concrete materials are mentally carried with the artist, and, as such, often help to shape plans.

The planning dilemma is an offshoot of the general art making dilemma, and may be quite vague at first (e.g. "I have to plan my first batik"). Knowledge and experience are described as the manner in which the artist has learned to perceive the problem situation, and the information and methods the artist can draw upon from memory. These factors provide the artist with a storehouse of ideas, and may also act as a filter for comparing potential

ideas with similar concepts of the past. Or they may aid in determining the feasibility of the course of a particular direction in the process.

The goal conceptions are the artist's anticipatory notions of the effective solution to the art problem. These include all the features of the goal and of the problem which are important to the artist at any point in the thought process and are usually sketchy and incomplete in this early stage. The materials component of the discovery cycle encompasses not only the required "tools of the trade" (such as the electric skillet and brushes for batik) or the supplies (like dyes and fabric), but also any sources of information that might be used in the art-making situation. The purpose of the materials is to act as a resource for problem conceptualization, that is, to offer an "outside" source for ideas.

The interaction of these four factors produces the initial problem conception which is the abstract schema that the artist considers worthy of further development. Often this is embodied in a preliminary, rough sketch -- a visual represenation of the vague idea, which is deserving of further investigation.

The second stage of the model - Problem Forumlation and Solution (Figure 3) - includes the design cycle which features the progressive elaboration of the initial problem conception over time. There are three phases constituting each revolution of the design cycle.

1. Elaboration -- the embellishment and further completion of the problem conception (the artist's anticipatory idea of the solution to the problem, the goal-as-attained). Elaboration

occurs by detailing the problem conception or by addressing particular subproblems. These functions may take place through "means actualization" -- applying elements, or routines, stored in memory to the current situation; or through "means abstraction" -- applying new elements to produce new results. The subproblem or the partial problem conception solutions are submitted to the second phase of the design cycle.

2. Investigation -- the analysis of the elaborations, to determine their success or failure. Knowledge and experience are relied upon to furnish the investigative procedure that will be appropriate to the task at hand. The initial problem conception, or total goal conception, as the pervasive quality, is expected to act as the criterion for measurement.

"Trying out" -- the mental projection and visualization of the situational outcome -- has been found to be one method of analyzing the workability of an elaboration that is frequently used by the artist. The investigative phase of the second stage not only allows for the judging of the success or failure of a previous elaboration, but it also supplies new knowledge about the problem solution by unearthing information about facets of the problem that were not included in the total problem conception and not foreseen in the previous elaboration.

3. Adaptation -- the transitional juncture in the circuit representing both the ending and the beginning of the cycle. It centers upon the development and completion of the total problem/goal conception. Beginning as a vague and generalized idea, the total conception evolves through elaboration until it is individualized,

distinctive, transformed, and fully realized. Adaptation facilitates this process by formulating and developing the total problem/goal conception at the conclusion of each rotation through enrichment and/or structural change. This, in turn, directs the next cycle of elaboration by determining what subproblems should be detailed next. Adaptation thus integrates what has gone before and prepares for what is to follow.

The three phase design spiral of elaboration, investigation and adaptation runs its course until the problem/goal conception has been entirely actualized, with the solution equivalent to the anticipation. The initial problem/goal conception has become the total goal conception; it has successfully maneuvred the process to its conclusion, even as its form has been shaped by the design cycle. The product of the progression --the art object-- may now be assessed for its qualitative integrity and its personal value.

The third stage of the model -- Problem Solution Evaluation and Routinization (Figure 4) -- allows for the measurement of the product by personal, artist-centered standards. (These may include, among others, the impact of feedback by others; societal expectations; qualitative, formalistic characteristics; media challenges; technical considerations; expressive components, etc.) The work may be deemed successful or unsuccessful wholly or partially. If successful, the solution (or total goal conception) is accepted. The various aspects of the making are passed into routinization for processing into long term memory, becoming part of the artist's repertoire of knowledge and experience which will

affect future problem finding and solving approaches.

If the solution is judged unsuccessful, one of two courses may be followed. The product/solution may be revised, i.e. sent back to the design cycle for amendment; or it may be rejected totally. The latter would seem to be rarely expected (and did not occur in this study). It is unlikely that the art work would have progressed to this terminal point without being radically changed and salvaged along the way, due to the safeguards of knowledge and experience operating in both the discovery cycle and the design spiral of the experienced batik artist. (This would more likely occur in the realm of the novice, which was not investigated in this study.) In either case, it would seem probable that information about the accepted solution, or any of its objectionable facets would also be channeled into memory storage, to act as a screen or filter in future decisions concerning process or product feasibility.

Routinization of strategies and activities were quite evident in this study. The veteran batiker was heavily dependent upon her past experience in the medium, as evidenced in her approach to selecting appropriate and workable subject matter, in choosing the proper tools and most fitting materials, in determining the color progression, in handling aberrations that arose in the process, in judging the limitations of the materials/process, in estimating the time consumption of the procedures, and in envisioning the possibilities and effects of the additional fabric surface manipulations (i.e. screen printing, quilting, stuffing). These past experiences freed the artist from mundane procedural concerns and provided efficient and economical methods for the technical and aesthetic pursuits of creative problem solving.

As an abstraction of reality, a model may be considered good in the sense that it is an accurate representation of the reality for which it is intended to stand. The model in this study appears to meet these conditions in that it externalizes the design process by representing parts of the problem-solution situation, and by portraying the relationships among these parts. The model revealed the artist's mental strategies and their concomitant physical manifestations that underpin the stage-to-stage operations of batik making. It addressed the conditions that affected subtle or overt changes within the batik (and from one work to the next in the thesis series).

The model's underlying aim is to bring creative problem finding, formulating and solving into the open so as to make public what is going on in the artist's mind. Such a planning and problem solving model for art making that divulges strategic modes of the artist, that reveals where ideas are found, how plans for execution of the work are formulated, and how satisfying solutions are reached, may ultimately lead to a better understanding of the "mysterious" art making process itself.

The Role of Naturalistic Inquiry

In addition to the formulation of the artistic model of planning and problem solving, a concern of this study was the determination of the value of the research techniques of naturalistic inquiry for its use in exploring the artistic process. The two naturalistic approaches employed in this investigation were somewhat out of their usual elements here. Ethnographic methods are normally used in group or cultural situations. Process tracing is generally applied to short-term, single-line of thought investigations. Yet they combined here to produce an illuminating and effective account of the case study of a batiker's creative thinking and making.

The observations and field notes made by the researcher in the studios supplied the general overview of the batiking situation. This was made possible through the continiuity of the contact with the situation, which insured the capturing of details that could easily have escaped the infrequent visitor or "one-shot" recorder. Over the three month period, patterns of thinking and acting emerged which revealed the artist's planning approaches and problem solving strategies. These were often subtle and illusive emanations, requiring careful observations. The field notes, thusly, provided a comprehensive picture of the art activity and the environment in which the creative task took place.

The aim of process tracing in this investigation was to observe the avenue of thinking and decision making as these occurred in the natural setting. The batiker's words were recorded on tape as she "thought aloud" while she planned and worked. These recordings,

along with her written journal (with almost daily entries), constitute a rich source of information as to what was going on when the artist made her art. The journal entries and taped remarks tended to be spontaneous and extemporaneous--made without much rationalization or theorizing, reflecting those aspects of the process that had special meaning to the artist that she wished to share. Their content originated with her, and thus revealed that which was of primary concern to her as she worked through the projects. It is these records that unearth the intriguing, mysterious, and usually convert mental activity of planning and problem solving and explain the often puzzling strategies employed by the artist.

Naturalistic inquiry would appear to have provided the best method for uncovering the richest sources of data for analysis in this investigation. It's nature demanded extended contact with the situation which, in turn, allowed for the recognition of events and characteristics that were typical as well as those that were not. Guba (1978) remarks that naturalistic inquiry is especially meritorious for studying process, and, "...as a general premise, it is probably safe to assert that the best way to study process is to observe it directly, rather than to infer its nature from the known imput, and the observed output" (p.25)

Naturalistic inquiry is a relatively recent methodology and has not yet been fully articulated. Nevertheless, many researchers believe the inevitable questions concerning procedure and authenticity can be answered sufficiently well to permit confidence in its operation in the field. One test of authenticity of the naturalistic method would be, according to Eisner (1979) to determine the

closeness in match between the data and inferences of a study and the perceptions of the participant who must find it credible and persuasive. The artist in this investigation was, consequently, asked to read and react to the study after its conclusion. She remarked upon the "exactness" with which her thoughts and actions were captured: "There is no question in my mind...this shows the progression of creative thought I feel I worked through."

Results of the Study

The results of this study are meant to aid in the generation of a theoretical perspective on creative making as problem-solving activity, characterized by the novelty and complexity of the task. Towards this end, the theoretical description elicited through this study of the creative process was further illuminated by an abstract model of problem solving behavior. This model allows an interpretative analysis of the artistic case in a way that is compatible with the nature of the creative act. It focuses on (1) the discovery of the problem as the result of environmental or internal tensions,(2) the cyclical nature of the design process which leads to the formation of the tangible solution to the found problem, and which alludes to the dominant role of previous experience in the progression of the work; and (3) the pervasive problem/goal conception which both directs the design process and is, simultaneously, structured by the metamorphosis of the unfolding art process/product. The model provides a new vehicle for describing and understanding the artistic process--for illuminating the proverbial black box of creative mystery.

The findings of this study indicate that planning is a significant activity of the batik artist, requiring purposeful deliberation.

Planning is a necessity for batik, and for the crafts in general. Too often in art education programs, this planning aspect is downgraded in the production of art work, in favor of the "freer" and the more immediate experience, which tends to be linked with the so-called "Fine Arts." The latter have been traditionally viewed as almost totally dependent on spontaneous ideation, with emphasis on fluency, flexibility and novelty--not on process. The inference is that the creative process is limited to the impulsive act, and that a stress on process would preclude the relevancy of intelligence and ideation.

This view of art making is probably based upon romantic ideas of "inspiration," and psychological concepts of "spontaneity." In these traditions, there is a tendency to use the least resistant or demanding media, thereby permitting the creative process to be carried out at its "highest" level (namely, in immediate and direct media like painting and drawing which entail a minimum of process). This perspective has eventuated in a generally low regard for the crafts as worthwhile creative media, because they do not encourage pure spontaneity.

Held in similar low esteem, or simply not acknowledged, then, is the view of the creative process which requires planning, one wherein the artist must move in a fairly orderly progression through a series of established procedures and phases. (This attitude endures, despite the fact that several media categorized as fine arts--printmaking, carved sculpture, etc., involve contraints of form and process as well.)

A fuller conception of the creative process, based on this study, may bring about an emphasis on human capabilities that have

not heretofore been considered significant by many in the field of art education. A newer, more embracing notion of the artistic process would call for an acceptance of the nature of the craft media that require planning and process development.

The need for planning and problem solving in batik as demonstrated in this study may be viewed as having a strengthening influence on the creative process. The artistic process model developed here is not founded on arbitrary values which are opposed to the human capabilities evident when planning. Rather, the model allows for the planning and problem solving activities which are the hallmarks of the crafts. It centers on the natural progression of finding and formulating the problem that is, over time, elaborated and refined until it reaches its final form.

This study and its resulting model encourage the valuing of art as process, not just product. It gives attention to the medium and material as important concerns in aesthetic activitiy and evaluation. Also, this investigation stimulates a reconsideration on the part of art educators: that we may come to value not only that which is the result of inspiration and spontaneous activity, but also that which is the outcome of a more slowly and laboriously developed process of design. It is my hope that a consequence of this study may be the deeper appreciation of, and a more genuine respect for, the batik making process and for craftsmaking in general.

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